

## TO THE CONSUMER

### FULL ONE YEAR WARRANTY

For one year from date of purchase, APF will repair defects in material or workmanship, free of charge, which appear in the operation of this electronic calculator, unless caused by damage resulting from corrosive leakage of batteries or from the unreasonable use of this product.

To obtain service under this warranty, return this calculator to your Dealer with evidence of date of purchase, or return it directly to APF Service, prepaid, with proof of purchase date.

**OUT OF WARRANTY SERVICE.** State the nature of your difficulty. As with any fine equipment, pack carefully and forward via insured, prepaid parcel post to:

**APF SERVICE CENTER**  
43-17 Queens St.  
Long Island City, N.Y. 11101

**APF ELECTRONICS, INCORPORATED**  
NEW YORK, N.Y. 10022.

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**APF mark 21**

**Handheld  
Memory Calculator  
with Percentage Key**

**Owner's Manual**



## INTRODUCTION

Modern electronic technology has provided a new tool for use in home, office or school. Your Electronic Calculator will perform standard Addition, Subtraction, Multiplication and Division in chain or mixed calculations. The addition of a MEMORY register, with full capability to Add to or Subtract from the MEMORY, has made possible calculations of complex problems. In addition to such added features as Automatic Percentage calculations your calculator will automatically store a Constant for all four functions of Addition, Subtraction, Multiplication and Division.

You may work from an internal battery source or, by means of an [optional] A.C. adaptor, from any convenient 110-120 volts A.C. outlet.

To simplify operation, your calculator is programmed for "THINK AND TOUCH"—"THINK" the mathematical sequence and "TOUCH" the appropriate keys as you think—the correct answer instantly appears on the bright, clear eight-digit display. The decimal point automatically moves to the correct position.

## SUGGESTED USES

### Home

Budgets • Unit Pricing • Stock & Bond Investments  
Interest Rate • Check Book Balancing  
Clothing Invoices • Grocery Bills • Taxes

### Business

Expense Report • Percentage Profit • Cost Analysis  
Compound Interest • Payroll • Taxes • Invoicing

### School

Check Basic Arithmetic Away From Home  
Budget • School • Tuition  
Slide Rule Calculations

**Convenient, rapid, accurate. You'll find many uses for your Electronic Calculator.**

## PORTABLE BATTERY OR A.C. OPERATION

- Your Compact Portable Electronic Calculator is made with a sealed Rechargeable battery pack. Under normal use you can expect about 6 to 8 hours of calculation time for a fully charged battery.
- When the battery is almost discharged the display will become dim and erratic. To prevent improper calculations the battery must be recharged as soon as possible.

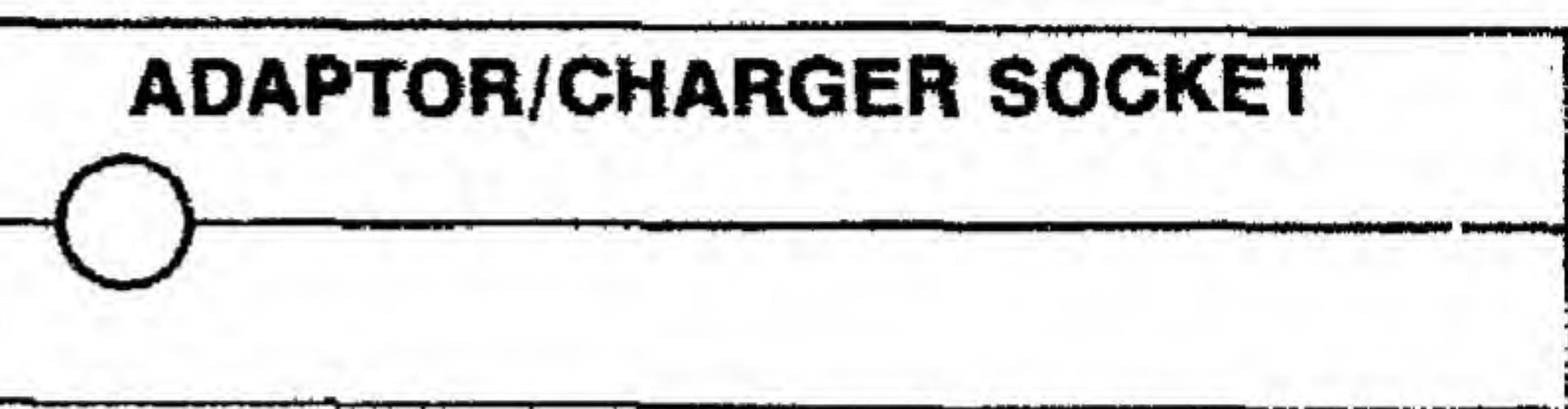
### Battery Charging

1. Turn the Power Switch to the OFF position.
  2. Connect the Charger/Adaptor into a convenient source of 110-120 volts A.C.
  3. Firmly push the Charger/Adaptor plug into the rear socket of the calculator.
  4. A full charge will take about 14 hours and is best done overnight.
- **Caution**—To prevent damage to the battery pack and calculator, do not use any charger/adaptor other than Model 415.

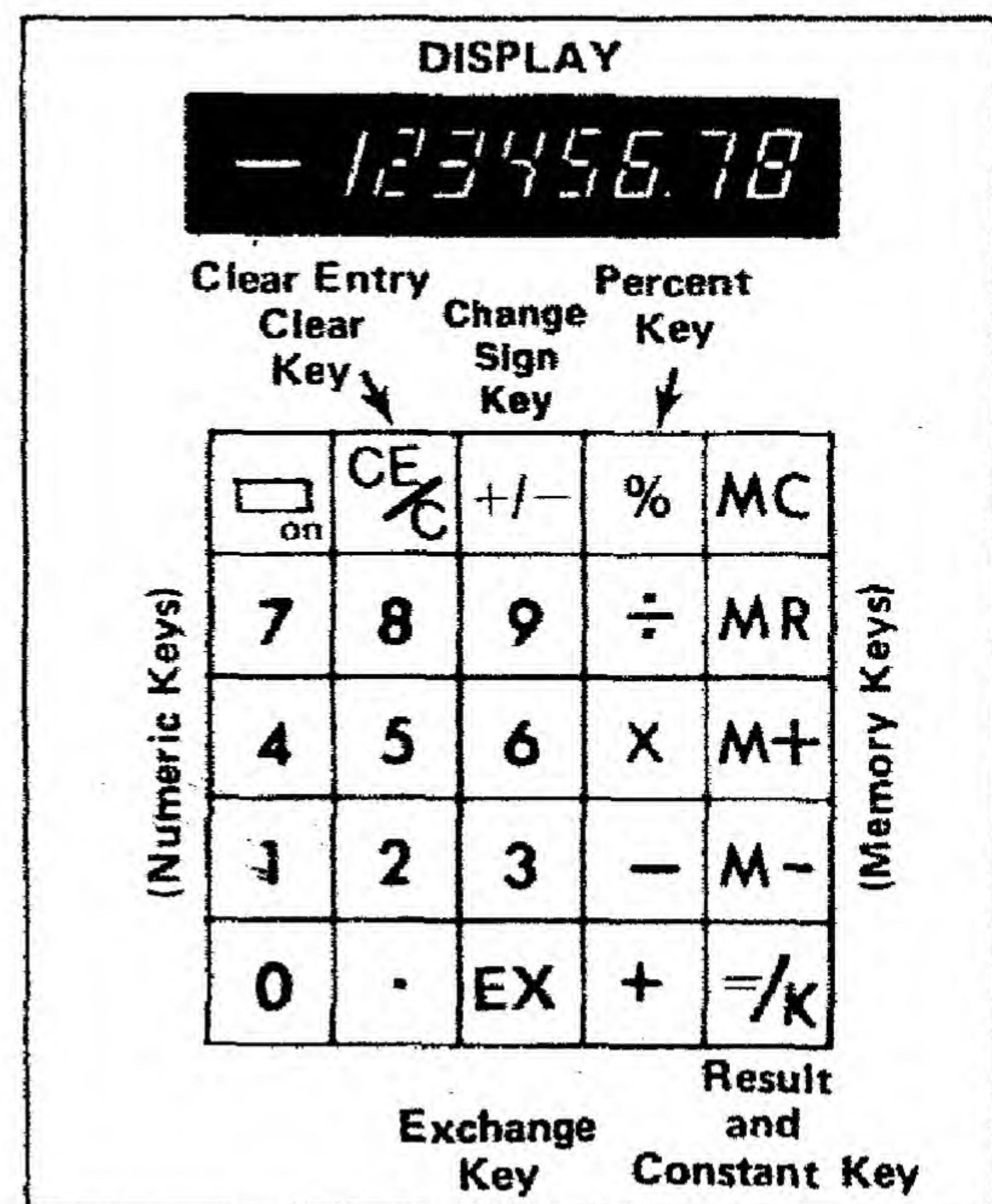
### AC Operation:

Turn the power switch to the OFF position. Connect the charger/adaptor to a source of 110-120 Volts A.C. and connect the battery plug to the rear socket of the calculator. Then simply turn the power switch on.

**NOTE:** When disconnecting the charger/adaptor, always disconnect the plug from the calculator first.



- Memory Indicator
- Minus Sign



#### KEYS AND SWITCHES

**POWER SWITCH**—Turns the calculator "ON" or "OFF". A red dot will be visible when the switch is in the "ON" position.

**NUMERIC KEYS**—Standard 1 to 9 keyboard is provided as well as [0] and decimal point [.]

**[CE/C] CLEAR ENTRY/CLEAR KEY**—This is a multi-function key which will clear the display of the last entry or result on the first push, and clear the calculator of all previous calculations on the second push. During overflow, touching [CE/C] once will clear the overflow symbol and allow further calculations. **NOTE: MEMORY CLEAR MUST BE DONE SEPARATELY.**

**[+] [-] [x] [÷] OPERATE KEYS**—These keys will perform any previous operation as well as instruct the calculator as to the next operation to be performed.

**[=/K] RESULT KEY**—At the conclusion of calculation, touching this key will immediately place the answer on the display. In addition this key operates the AUTOMATIC CONSTANT (K). (See section under calculations with a constant).

#### MEMORY FUNCTIONS

The memory is a place to store a number for future use.

**[M+]** — Adds the number on the display to the memory and leaves the display unchanged.

**[M-]** — Subtracts the number on the display from the memory and leaves the display unchanged.

**[MR]** — Clears the display and recalls the number from the memory to the display. **Note:** The number also remains in the memory.

**[MC]** — Clears all numbers from the memory and leaves the display alone.

## SPECIAL FUNCTIONS

[%] PERCENT KEY—This is a special purpose key used to simplify calculations involving Percentage (mark-up, discount, yield) see examples page 12.

[EX] EXCHANGE KEY—This is a special purpose key used to exchange the contents of the Display Register and the Constant Register. It is useful to exchange the numerator and denominator in division. See example on page 15.

[+/-] SIGN CHANGE—Changes the sign of the displayed number from plus to minus or minus to plus.

## DISPLAY INDICATORS

[–] MINUS SIGN—The arithmetic sign of the display number. The minus sign always appears in the left most digit position of the display.

[•] MEMORY INDICATOR—The memory in use indicator will light when any number except zero is in the memory. This indicator appears in the left most digit position of the display.

OVERFLOW—When the result of a calculation is greater than 99999999. or less than –99999999., the capacity of the calculator has been reached. This overflow condition is indicated by the appearance of 8 decimal points on the display. Further calculations are prohibited until [CE/C] is touched once. Then the display shows the answer with the decimal point 8 places to the left of the correct position.

## BASIC OPERATING INSTRUCTIONS

### Power On

Slide power switch to the right to turn on calculator, touch [CE/C] (Twice) and [MC].

### Number Entry

#### TO ENTER A NUMBER, "TOUCH" THE NUMERIC KEYS IN SEQUENCE.

Example: To enter 12.3

KEY SEQUENCE	DISPLAY
Touch [CE/C] Twice	0.
Touch 1	1.
Touch 2	12.
Touch [•]	12.
Touch 3	Answer 12.3

### TO CLEAR AN INCORRECT ENTRY, USE THE [CE/C] KEY.

Example: To calculate  $12 \times 7 = ?$

KEY SEQUENCE	DISPLAY
Touch [CE/C] Twice	0.
Enter 12	12.
Touch [x]	12.
In error you enter 8	8.
	"MISTAKE" "MISTAKE"
Touch [CE/C]	0.
Enter 7	7.
Touch [=K]	Answer 84.

NOTE: After clearing an entry, do not duplicate the operate function.

DECIMAL POINT—The decimal point in the answer is always floating with a maximum of 7 places.

Example:  $12.34 \times 6.78 = ?$

KEY SEQUENCE	DISPLAY
Touch [CE/C] Twice	0.
Enter 12.34	12.34
Touch [x]	12.34
Enter 6.78	6.78
Touch [=K]	Answer 83.6652

NOTE: The decimal point automatically floated to 4 places.

## EXAMPLES OF BASIC FUNCTIONS

NOTE: Touch [CE/C] twice before beginning a calculation.

### ADDITION

Example No. 1: to calculate  $13.35 + 4.56 = ?$

- |    |       |       |         |       |
|----|-------|-------|---------|-------|
| A. | Enter | 13.35 | Display | 13.35 |
| B. | Touch | [+]   |         | 13.35 |
| C. | Enter | 4.56  |         | 4.56  |
| D. | Touch | [=/k] | answer  | 17.91 |

Example No. 2: to calculate  $9 + 17 + 32.5 = ?$

- |    |       |       |         |      |
|----|-------|-------|---------|------|
| A. | Enter | 9     | Display | 9.   |
| B. | Touch | [+]   |         | 9.   |
| C. | Enter | 17    |         | 17.  |
| D. | Touch | [+]   |         | 26.  |
| E. | Enter | 32.5  |         | 32.5 |
| F. | Touch | [=/k] | answer  | 58.5 |

NOTE: Each time an operation key [+,-, X, ÷, %] is touched, the result of the previous calculation is displayed.

### SUBTRACTION

Example No. 1: to calculate  $436.14 - 103.9 = ?$

- |    |       |        |         |        |
|----|-------|--------|---------|--------|
| A. | Enter | 436.14 | Display | 436.14 |
| B. | Touch | [−]    |         | 436.14 |
| C. | Enter | 103.9  |         | 103.9  |
| D. | Touch | [=/k]  | answer  | 332.24 |

Example No. 2: to calculate  $183.70 - 341.60 = ?$

- |    |       |        |         |         |
|----|-------|--------|---------|---------|
| A. | Enter | 183.70 | Display | 183.70  |
| B. | Touch | [−]    |         | 183.70  |
| C. | Enter | 341.60 |         | 341.60  |
| D. | Touch | [=/k]  | answer  | -157.90 |

NOTE: The answer is a negative number (credit balance).

### MULTIPLICATION

Example No. 1: to calculate  $31.62 \times 58.6 = ?$

- |    |       |       |         |          |
|----|-------|-------|---------|----------|
| A. | Enter | 31.62 | Display | 31.62    |
| B. | Touch | [X]   |         | 31.62    |
| C. | Enter | 58.6  |         | 58.6     |
| D. | Touch | [=/k] | answer  | 1852.932 |

Example No. 2: to calculate  $3 \times 4 \times 1.05 = ?$

- |    |       |       |         |      |
|----|-------|-------|---------|------|
| A. | Enter | 3     | Display | 3.   |
| B. | Touch | [x]   |         | 3.   |
| C. | Enter | 4     |         | 4.   |
| D. | Touch | [x]   |         | 12.  |
| E. | Enter | 1.05  |         | 1.05 |
| F. | Touch | [=/k] | answer  | 12.6 |

### DIVISION

Example No. 1: to calculate  $196 \div 7 = ?$

- |    |       |       |         |      |
|----|-------|-------|---------|------|
| A. | Enter | 196   | Display | 196. |
| B. | Touch | [÷]   |         | 196. |
| C. | Enter | 7     |         | 7.   |
| D. | Touch | [=/k] | answer  | 28.  |

### CHAIN CALCULATIONS

Example No. 1: to calculate  $15.3 \times 13.7 \div 4 + 19 - 11 = ?$

- |    |       |       |         |         |
|----|-------|-------|---------|---------|
| A. | Enter | 15.3  | Display | 15.3    |
| B. | Touch | [X]   |         | 15.3    |
| C. | Enter | 13.7  |         | 13.7    |
| D. | Touch | [+]   |         | 209.61  |
| E. | Enter | 4     |         | 4.      |
| F. | Touch | [+]   |         | 52.4025 |
| G. | Enter | 19    |         | 19.     |
| H. | Touch | [−]   |         | 71.4025 |
| I. | Enter | 11    |         | 11.     |
| J. | Touch | [=/k] | answer  | 60.4025 |

## CONSTANT OPERATION

The calculator provides for automatic constant operation for add, subtract, multiply and divide. This operation is automatic and activated by touching either the +, -, ×, ÷, or [=k] keys as shown in the following examples.

### REPEAT ADDITION OR SUBTRACTION

If during a calculation, you require adding or subtracting a number repeatedly, simply press the [=k] key the desired number of times after entering the number.

Example: To calculate  $2+4+4+4-3-3=?$

	KEY SEQUENCE	DISPLAY
Touch	[CE/C] Twice	0.
Enter	2	2.
Touch	[+]	2.
Enter	4	4.
Note: You wish to add the number 4 three times		
Touch	[=k] 3 Times	14.
Touch	[−]	14.
Enter	3	3.
Touch	[=k] Twice Answer	8.

### POWER CALCULATIONS

Example:  $9^4=?$

	KEY SEQUENCE	DISPLAY
Touch	[CE/C] Twice	0.
Enter	9	9.
Touch	[×]	9.
Touch	[=k] 3 Times Answer	6561.

### RECIPROCALS

To find the reciprocal of a number or calculated answer use the automatic constant. When the number you want to take the reciprocal of is being displayed, simply press [÷], then [=k] then [=k].

Example:  $\frac{1}{10} = .1$

	DISPLAY
Enter	10
Touch	[÷] [=k] [=k]

## CALCULATIONS USING A CONSTANT

### CONSTANT MULTIPLICATION

For multiplication the SECOND number entered is the Constant

example	operation	display
<b>3.72 is a constant</b>		
15	$15 \times 3.72 [=k]$	55.8
30	$30 [=k]$	111.6
215	$215 [=k]$	799.8

### CONSTANT DIVISION

For division the SECOND number entered is the Constant

example	operation	display
<b>12 is a constant</b>		
48	$48 \div 12 [=k]$	4.
180	$180 [=k]$	15.
756	$756 [=k]$	63.

### CONSTANT ADDITION

For addition the SECOND number entered is the Constant

example	operation	display
<b>17 is a constant</b>		
15	$15 [+]$ 17 [=k]	32.
27.5	$27.5 [=k]$	44.5
92.8	$92.8 [=k]$	109.8

### CONSTANT SUBTRACTION

For subtraction the SECOND number entered is the Constant

example	operation	display
<b>25.5 is a constant</b>		
57	$57 [-]$ 25.5 [=k]	31.5
32	$32 [=k]$	6.5
12	$12 [=k]$	- 13.5

NOTE: Since the constant operation is automatic do not push the [=k] key more than once for any operation.

**PERCENTAGE CALCULATION %**—The percent key is useful for dividing numbers by 100, and in markon-markdown problems, it reduces the number of steps required.

#### Percentage Calculations

**YIELD:** You borrow \$5000. How much interest will you pay at 7.75%?

5000 [ $\times$ ] 7.75 [%] 387.5

**MARK UP:** Your cost is \$323.00 and you wish to earn 16%.

323 [+] 16 [%] [=k] 374.68

**MARK DOWN (DISCOUNT):** Your normal selling price is \$323.00 and you want to discount the item by 16%.

323 [-] 16 [%] [=k] 271.32

#### USE OF THE MEMORY

The Memory is a place to store a number for future use.

**NOTE:** Always clear the memory [MC] and display ([CE/C] twice) before beginning a new problem.

#### Sum and Difference of Products and Quotients

Problem:  $(78 \times 96) - (41 \times 23) + (40 \div 5) = ?$

Key	Display	Memory
78	78.	0
[ $\times$ ]	78.	0
96	96.	0
[=/k]	7488.	0
[M+]	7488.	7488
41	41.	7488
[ $\times$ ]	41.	7488
23	23.	7488
[=/k]	943.	7488
[M-]	943.	6545
40	40.	6545
[ $\div$ ]	40.	6545
5	5.	6545
[=/k]	8.	6545
[M+]	8.	6553
[MR]	6553.	Answer

#### Product of Sum and Difference

Problem:  $(12 + 34) \times (98 - 76) = ?$

Key	Display	Memory
12	12.	0
[+]	12.	0
34	34.	0
[=/k]	46.	0
[M+]	46.	46
98	98.	46
[-]	98.	46
76	76.	46
[X]	22.	46
[MR]	46.	46
[=/k] answer	1012.	46

#### PRACTICAL EXAMPLES

**Example 1:** Your checkbook has a starting balance of \$86.39. You write checks for \$21.00, \$32.45 and \$14.26, then deposit \$162.26. What is your balance?

ENTER	TOUCH	DISPLAY
	[CE/C] Twice	0.
86.39	[-]	86.39
21.00	[-]	65.39
32.45	[-]	32.94
14.26	[+]	18.68
162.26	[=/K]	Answer
		180.94

**Example 2:** You drive in your automobile 186 miles and use 12.0 gallons of gas. How many miles, to the gallon, did you average? Use  $186 \div 12$  miles per gallon.

ENTER	TOUCH	DISPLAY
	[CE/C] Twice	0.
186	[ $\div$ ]	186.
12	[=/K]	Answer
		15.5

**Example 3:** What is the invoice to a customer who buys 12 pieces of 1 item at \$12.37 each and 24 pieces of a second item at \$18.69 each? Include 8% sales tax.

ENTER	TOUCH	DISPLAY	MEMORY	COMMENTS
	[CE/C] twice	0		Clear display.
	[MC]	0.	0	Clear memory.
12	[X]	12.	0	Total cost
12.37	[=/k]	148.44	0	of item 1.
	[M+]	148.44	148.44	Add to memory.
24	[X]	24	148.44	Total cost
18.69	[=/k]	448.56	148.44	of item 2.
	[M+]	448.56	597.00	Total cost
	[MR]	597.00	597.00	of both items.
	[+]	597.00	597.00	Plus
8	[%]	47.76	597.00	sales tax =
	[=/k]	644.76	597.00	Total

#### EXAMPLE OF OVERFLOW

$$4266 \times 53125 \times 1862 = ?$$

A.	Touch	[CE/C]	Twice	Display
B.	Enter	4266		4266.
C.	Touch	[X]		4266.
D.	Enter	53125		53125.
E.	Touch	[X]		2.2.6.6.3.1.2.5.

**NOTE:** All decimal points lit indicate overflow.

To continue

F. Touch [CE/C] 2.2663125

The decimal point is shifted 8 places to the left. The correct answer is 226631250.

G. Enter 1862 1862.

H. Touch [=K] 4219.8738

Correct answer is  $4219.8738 \times 10^8 = 421987380000$ .

#### EXAMPLE OF EXCHANGE KEY OPERATION

$$\text{To Calculate } \frac{230}{10 \times 69} = ?$$

Calculate the denominator first.	Display
A. Enter 10	10.
B. Touch [X]	10.
C. Enter 69	69.
D. Touch [=]	690.
E. Enter 230	230.
F. Touch [EX]	690.
G. Touch [=K]	Answer 0.3333333

#### METRIC CONVERSION CONSTANTS

From	Multiply by	To
Millimeters	.03937	Inches
Meters	39.37	Inches
Cubic centimeter (cc)	.061025	Cubic inches
Kilometers	.621377	Miles
Liters	.26418	Gallons
Grams	.03527	Ounces
Kilograms	2.2046	Pounds

For reciprocal constants (such as inches to millimeter) use reciprocal of constant as multiplier (1 divided by .03937 = 25.4)

#### CONVERSIONS OF TEMPERATURE

Fahrenheit/Centigrade

Temp F [-] 32 [X] 5 [=] 9 = Temp. C.

Temp C [X] 9 [=] 5 + 32 = Temp. F.

**Example:** How many inches is 60 millimeters?

KEY SEQUENCE	DISPLAY
Touch [CE/C] Twice	0.
Enter 60	60.
Touch [X]	60.
Enter .03937	0.03937
Touch [=K]	Answer 2.3622